

# ME 370: The Mechanical Engineering Profession

Lecture 06: An Introduction to Engineering Ethics

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## Purpose

Provide basic background for future discussions of engineering ethics.

## Resources

### Books

1. Charles E. Harris, Jr., Michael S. Pritchard, Michael J. Rabins, 2009, *Engineering Ethics: Concepts and Cases*, Wadsworth, Belmont, CA.
2. Mike W. Martin and Roland Schinziger, 2010, *Introduction to Engineering Ethics*, 2nd ed., McGraw-Hill, Boston, MA.
3. Mike W. Martin and Roland Schinziger, 2005, *Ethics in Engineering*, 4th ed., McGraw-Hill, Boston, MA

### Web sites

1. <http://www.onlineethics.org/>
2. <http://ethics.tamu.edu/>
3. <http://www.asme.org/groups/centers-committees/ethics-center>
4. <http://www.nspe.org/Ethics/>

# What is a professional?

1. Performing a service for pay; not a hobby
2. Requires advanced training
3. Self-regulated
4. Performs a public good

Mike W. Martin and Roland Schinziger, 2005, Ethics in Engineering, 4th ed., McGraw-Hill, Boston, MA.  
See also, handout "What is a Professional" on the class web site for week 6

## Professional Ethics

Standards defined by a community

- Stated in a formal code
- Focuses on issues important to the profession
- Professional ethics usually take priority of personal morals  
Example: In presence of a medical doctor, we presume there is confidentiality, irrespective of the morality of the doctor.
- Professional ethics may be more or less restrictive than personal morals, e.g. religious values
- Positive and negative dimensions  
Prevent and avoid evil, while doing good.

Charles E. Harris, Jr., Michael S. Pritchard, Michael J. Rabins, 2009, Engineering Ethics: Concepts and Cases, Wadsworth, Belmont, CA.

## Dictionary Definitions

<b>Morals</b>	A person's standard of behavior or beliefs concerning what is and is not acceptable for them to do. Standards of behavior that are considered good or acceptable <sup>1</sup>
<b>Ethics</b>	Moral principles that govern a person's or group's behavior: Judeo-Christian ethics; the moral correctness of specified conduct: the ethics of euthanasia <sup>1</sup> .
<b>Engineering Ethics</b>	The field of applied ethics which examines and sets standards for engineers' obligations to the public, their clients, employers and the profession <sup>2</sup> .

1. Concise Oxford American Dictionary, 2006  
2. Wikipedia

# Morals are Embedded

“Moral values are embedded in engineering projects as standards of excellence, not ‘tacked on’ as external burdens.”

Martin and Schinzinger, 2010, p. 2

# Engineering Design

Definition by ABET

*Engineering design is the process of devising a system, component, or process to meet desired needs. It is a decision-making process (often iterative), in which the basic science and mathematics and engineering sciences are applied to convert resources optimally to meet a stated objective.*

See: <http://www.me.unlv.edu/Undergraduate/coursenotes/meg497/ABETdefinition.htm>

# Causes of Problems

1. Lack of vision: group think, tradition
2. Incompetence
3. Lack of time or proper materials (bad management)
4. Silo mentality: information is compartmentalized
5. Assumption that it's someone else's job to catch the safety problems
6. Improper use or disposal by unwary owner or user
7. Dishonesty
8. Inattention

Mike W. Martin and Roland Schinzinger, 2010,  
Introduction to Engineering Ethics, 2nd ed.,  
McGraw-Hill, Boston, MA, pp. 8-9

# Roles

In what roles might ethical issues arise in your life?

- Student
- Employee
- Manager/administrator
- Citizen

List examples of each

# Ethical Dilemmas

"...ethical dilemmas: situations in which moral reasons come into conflict or in which the applications of moral values are problematic, and it is not immediately obvious what should be done"

Martin and Shinzinger, 2010, p. 2

# Moral reasoning

- Ethical dilemmas do not have tidy answers.
- Engineering codes of ethics help us to define standards, but only provide answers in the simplest of situations
- Ethical/moral reasoning skills help

## Ethical and Moral Reasoning Skills

1. Moral awareness
2. Cogent moral reasoning
3. Moral coherence
4. Moral Imagination
5. Moral Communication

Mike W. Martin and Roland Schinziger, 2010,  
Introduction to Engineering Ethics, 2nd ed.,  
McGraw-Hill, Boston, MA, pp. 11

## Moral Commitment: beyond skills

6. Moral reasonableness
7. Respect for persons
8. Tolerance of diversity
9. Moral hope
10. Integrity

Mike W. Martin and Roland Schinziger, 2010,  
Introduction to Engineering Ethics, 2nd ed.,  
McGraw-Hill, Boston, MA, pp. 11

Direct cognitive skills

## Moral Awareness

Do you recognize the moral dimension of a decision?

Are you aware how codes engineering ethics might apply to the current situation?

Direct cognitive skills

## Cogent moral reasoning

Can you identify the issues?

Can you articulate arguments on both sides?

Direct cognitive skills

## Moral coherence

Do you have a factually consistent viewpoint?

Is your understanding comprehensive?

Are all relevant facts being considered?

Direct cognitive skills

## Moral imagination

Can you identify alternative responses?

Are your views on the issue "black and white"?

Are you able to consider and develop creative solutions?

# Moral communication

Can you frame the issues using common ethical language?

Are you able to express issues in terms of the engineering codes of ethics?

## Case study: Paro robot



<http://www.parorobots.com/>